C·R·E·S® REPORT

The Center for Reproduction of Endangered Species (CRES) is operated by the Zoological Society of San Diego

WINTER · 1991 · 1992

PROYECTO TAGUA

The Zoological Society of San Diego maintains the only collection of Chacoan or giant peccaries (Catagonus wagneri) in captivity. Although peccaries differ from wild pigs, they may best be described as "hairy hogs." The 15 male and 10 female Chacoan peccaries are housed in four large outdoor enclosures. But don't race out to the San Diego Zoo or Wild Animal Park for a look, the collection is in Paraguay.

The taguas, as the Paraguayans call them, are interesting for a variety of reasons. First, they are the largest of the peccaries, weighing 75 to 100 pounds. They inhabit the inhospitable Gran Chaco region of Paraguay, Argentina and Bolivia. Their primary food is cactus. And, although described by fossil remains in the 1930s, they were thought to be extinct until their discovery by Ralph Wetzel in 1974. Although the tagua were fairly common when discovered, their numbers have dropped dramatically since then. Land clearing for farming, cattle grazing and road building have contributed heavily to habitat destruction, the taguas' main threat.

The name Chaco (from the Incan word Quecha, meaning good hunting land) belies the harshness of the area but aptly describes the richness of its biodiversity. This region, the hottest of all South America, was called the "green hell" during the Chaco War in the 1930s. It is a forest of cacti, thorny bushes and thorny trees. But within this forest live such species as the giant anteater, ocelot, pampas cat, jaguarundi, striped owl, greater rhea and many more. Within a three month period in 1989, more than 100 bird species were sighted in the tagua reserve. Although the tagua is the flagship species, many other species will benefit from the conservation of this ecosystem.

In an effort to alter the decline of the taguas, Dr. Kurt Benirschke founded Proyecto Tagua in 1986 and purchased two hectares of land in the Paraguayan Chaco. The Zoological Society of San Diego has been a supporter of this project since its inception and currently leases six hectares of adjacent land for Proyecto Tagua. Dr. Werner Heuschele, Research Director of CRES has been the Project Director since November of 1989. On-site operations are supervised by the Project Manager, Jakob Unger.

The goals of the Proyecto Tagua effort are varied and ambitious. They include: achieving and maintaining a captive breeding herd of 40 to 50 tagua with representatives from at least five genetic lines; acquiring a minimum of 40 hectares of native Chaco habitat; investigating potential reintroduction sites for excess taguas; initiating educational programs for the local community; and accommodating research scientists and graduate students. ■

Virology

For the past several years, it has been proposed that the cheetah, as a species, lacks genetic diversity. Some investigators believe that this is the cause for an increased susceptibility, in some cheetahs, to certain infectious diseases. After analyzing the cellular immune responses of cheetahs to two specific infectious agents, CRES virologist Dr. Michael Worley proposes an additional, if not alternative, theory.

The infectious agents, *Cryptococcus neoformans* and feline herpes virus, are unexpectedly associated with subclinical and clinical infections, respectively, in cheetahs at the Wild Animal Park. The fungus, *Cryptococcus neoformans,* is an opportunistic organism; one that does not usually infect healthy animals. Feline herpes virus infection should not be present because all of the cheetahs at the Park are routinely vaccinated.

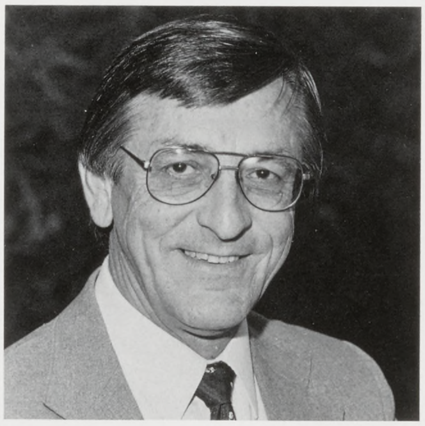
To evaluate the immune response of cheetahs, lymphocytes, a type of white blood cell, were purified from blood and grown under cell culture conditions. The blood was obtained during routine medical examination from animals that had been previously exposed to the agents, either naturally or as a result of vaccination. Either feline herpes virus or *Cryptococcus neoformans* were added to the cultures and the immune response, as indicated by the level of lymphocyte stimulation, was measured. The level of stimulation, or response which can vary from extremely low to high, represents the ability of an individual cheetah's immune system to respond to infectious agents to which it has previously been exposed.

The level of response among individual cheetah cultures did vary widely and low or high responding cheetahs, from whom blood was obtained on several occasions, were consistent in the level of their response. Further, when interleukin 2, human-derived protein sometimes used to stimulate immune responses, was added to the low response cultures, the level of stimulation was increased to the level of the high response cultures.

If cheetahs were genetically identical and, as a result, more susceptible to certain infectious diseases, all of the lymphocyte cultures would have responded at the same low level. In fact, cheetahs do exhibit extreme variation in the cellular immune response to these agents. Then what is the cause of their suggested increase susceptibility to infectious diseases? Dr. Worley's results suggest a problem with natural production of interleukin 2 in the lymphocytes of some cheetahs. Perhaps only the high responding cheetahs are capable of making the level of cellular immune response necessary for complete protection against a variety of infectious agents.

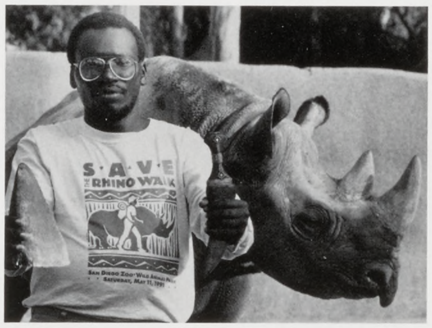
Dr. Worley is currently attempting to quantitate interleukin 2 in the lymphocytes of low and high responding cheetahs. Ultimately, it may be possible to use genetically engineered interleukin 2 with vaccines, providing the cheetahs support against these agents. ■

Director Awarded



CRES Director Dr. Werner Heuschele was honored for his contributions to academic veterinary medicine as a recipient of the 1991 Alumni Achievement Award from the University of California-Davis School of Veterinary Medicine. Throughout Dr. Heuschele's remarkable career, he has been a veterinary clinician, pathologist, field researcher, professor, foreign animal disease researcher and diagnostician, consultant and more. In additional to his D.V.M. degree from U.C. Davis, he has earned a Ph.D. in Veterinary Microbiology from the University of Wisconsin. Congratulations Dr. Heuschele! ■

Conservation Medalist



The Zoological Society of San Diego's 1991 Conservation Medal was awarded on September 20 to Mr. Michael Werihke of Kenya. Since his first walk for rhinos in 1982, the Rhino Man, as he is often called, has walked across two continents and raised millions of dollars for the conservation of rhinos and their habitat.

Mr. Werihke has earned worldwide respect for his devotion to, and achievements for, the rhinoceros. He received the Goldman Environmental Prize in 1990 and was included on the United Nations Environment Programme Global 500 Honor Roll in 1989. According to H.R.H. The Duke of Edinburgh, his "magnificent walk . . . will go down in history as a major contribution to the conservation of nature."

Mr. Werikhe supports his wife and two children by working in an automobile factory. He accrues time off for his walks by working seven ten-hour days each week. According to Michael Werikhe, "There are no national boundaries on the environment . . . The rhino will live or die because of us." ■

Inside CRES

Endocrinology

At the Desert Tortoise Conservation Center in Nevada, 120 tortoises have completed quarantine and are established in several new enclosures, the largest of which is nine acres. Under the direction of CRES endocrinologist Dr. Valentine Lance, blood samples from about 50 tortoises are taken monthly and ultrasonic imaging is conducted to ascertain the females' reproductive status.

In addition to chin gland secretion, stress hormone and female reproductive cycle studies, a new study on density-dependent stress will begin this spring. This study will provide valuable information on the tortoises' captive housing requirements. ■

Genetics

Dr. Oliver Ryder, a leader in the Przewalski's horse reintroduction movement, recently returned from the Mongolian People's Republic with exciting news. An acceptable release site has been found in a national park within a larger, protected area in the Gobi Desert. This gravel desert is dotted with oases sporting beautiful pastures suitable for the horses. "It is the most remote and wild place that I've been" recalls Dr. Ryder.

Protecting this habitat for the horses will benefit many other species in the area such as sand gazelle, wolf, fox, steppe eagle, various owls, and the dzeggatai or Mongolian wild ass. The local economy will also benefit from the employment that the national park will create.

Currently, vegetation, climatic and environmental impact surveys are being conducted by the Mongolian Academy of Sciences. As early as 1993, Przewalski's horses from around the world will arrive at the release site. Ultimately, the Przewalski's horse, currently extinct in the wild, will be reestablished in free-ranging populations in its native ecosystem.

Special thanks to the **John and Beverly Stauffer Foundation** for their support of this important research. ■

Reproductive Physiology

Artificial insemination (AI) enables reproduction between individuals separated by temperament, geography or time. For example, through AI, a male can sire offspring even after his death. Dr. Barbara Durrant has been investigating techniques of collecting and storing semen for use in AI. She has recently completed a study which compared the success of artificial insemination with fresh, refrigerated and frozen Temminck's pheasant semen. Prior to this study there was no information on the use of refrigerated bird semen. For the first time in any bird species, AI with previously refrigerated semen resulted in hatchlings. Also, this is the first time that pheasants inseminated with frozen semen successfully reproduced.

Dr. Durrant's study resulted in a 50% fertility rate from AI with semen refrigerated for up to 48 hours. The fresh semen fertility rate was 75% and the frozen 38%. These results are encouraging for the numerous bird species which may depend on the success of captive breeding programs for their survival. ■

Behavior

Historically cheetahs have been difficult to breed in captivity. This has been attributed to the poor quality of cheetah semen. At CRES, behaviorist Dr. Donald Lindburg, reproductive physiologist Dr. Barbara Durrant and research supervisor Susan Millard have explored this concept over the last ten years through study of the cheetahs at the Park's Cheetah Breeding Facility.

They discovered that of the 11 males who bred females, 10 succeeded in siring offspring. Yet, when the semen from these males was examined, it was found to be of poor quality. There does not appear to be a relationship between the quality of cheetah semen and male fertility. Rather, the phenomenal success rate of this facility appears to be the result of unconventional management techniques. ■

Infectious Diseases

The **Institute of Museum Services** (a federal agency that offers conservation project support to the nation's museums) and **The Bay Foundation, Inc.** have recently agreed to fund the next two years of research on the viral agent of malignant catarrhal fever. According to Senior Technician Robert Klieforth, a post doctoral fellow will be employed to conduct the

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study under Dr. Heuschele, the Project Director. This team will explore techniques for the detection of the virus in wildebeest and other ruminant species. The technology will enable the screenings of individual animals for asymptomatic carriers, and thus assist in the control of this deadly disease. ■

● Comparative Physiology

Dr. John Phillips' field studies of the monitor lizard in Namibia have produced some interesting results. Wild female monitor lizards experience their estrous cycles simultaneously. Further, their estrogen levels measure over 100 times the levels of captive females. Interactions between the wild male and female monitor lizards occur only during estrus. Results from this study suggest that when housed together in captivity, the male's presence suppresses the female's estrous cycle. This may explain the lack of cycling in the Zoo's previous collection of Komodo dragons. ■

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